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Housing, Hygiene, and Health

A Study in Old Residential Areas in Copenhagen

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ABSTRACT

The effect of 109 social, medical, housing, and hygienic factors on morbidity of 2,096 individuals was studied in 881 apartments in Copenhagen. "Thriving" (satisfaction), followed by "housing standard" and "personal hygiene," turned out to be the most prominent predictor for health. "Thriving of parents" was also important for the health of children. Excluding "thriving" in the analyses, "housing standard" and "personal hygiene" or components of these group factors were the important predictors for the health of the population studied, except for children below 3 years of age. For the health of these, the number of rooms used for sleeping purposes was the best predictor. The only other parameter found to influence the morbidities investigated was the total yearly income of the family, which was found to be a secondary predictor for adult morbidity during the last month of the investigation (March 1973). The analyses applied were Pearson correlation, AID-program, factor and multiple regression analyses.

STUDIES HAVE revealed that factors such as overcrowding, lack of basic sanitation (e.g., cold or hot water supply), garbage accumulation, and poor construction with leaky roofs or cracked walls exert substantial influence on health. However, extreme conditions are seldom found in developed countries, and the relative importance of various factors in housing conditions is difficult to analyze. Thus, contradictory or negative results have been obtained in the developed countries with respect to the relative importance of overcrowding, socioeconomic conditions, occupation, education, housing conditions, rehousing, etc., as they may affect morbidity.¹

During childhood, the area of residence, parents' social level, family size, history of respiratory diseases, and impairment of ventilatory function of the lungs influence health in adult life.²⁻⁴ A survey covering the field of housing and health was made by A.E. Martin⁵ in the United Kingdom, and by V. Christensen⁶ in Scandinavia.

Method

Six residential areas of Copenhagen were studied. Within each area we sampled a cluster of successive house numbers and stories. We included an equal number of men and women. The districts under study represented older houses in the central part of Copenhagen.

District One (Oesterbro) is characterized by wide streets with trees and small parks. Buildings are mainly large, fashionable-looking, older apartment houses containing large well-lighted flats with up to ten rooms or more, some with a desirable view. In this area, 183 families were questioned (89 males and 94 females).

District Two similarly consists of large, well-kept apartment houses with an exclusive location by one of the artificial lakes of Copenhagen (Sortedsøen). The flats are large and sunny, but about 100 m from the lake the

area borders on one of the most closely built-up and densely populated areas in Copenhagen (District Five), resulting in an inevitable interaction between the extremes of the social classes, especially as far as children are concerned. In this area, 91 families were questioned (33 males and 58 females).

District Three, nicknamed "Potatorows," is on the opposite side of the same lake. The buildings are low, well-separated, single-family houses about 100 years of age. Each house contains up to three small flats. The original quality of the houses was poor (small and damp, without shower, bath tub, or hot water installations). In front of the houses are small, well-kept gardens, and the friendly surroundings have attracted new social groups to the area. Simultaneously, extensive interior modernization has taken place, especially concerning hygienic facilities. In this area, 199 families were questioned (71 males and 128 females).

District Four is situated in a closed area between a main road (Oesterbrogade) and a big park. The houses were built in the midnineteenth century, after a cholera epidemic, as dwellings for workers. They are four long, two-story buildings divided into two-storied flats with separate house numbers. The flats are very small, usually not more than 25 m², and without hygienic or sanitary installations. The area includes an assembly building and common houses for bathing and washing. For each group of ten flats there is a chemical lavatory in a small addition to the houses. In front of each flat is a small garden, 10-20 m². In spite of the smallness of the flats and their very limited facilities, the inhabitants find so many compensating qualities in the surroundings that they express general contentment. In this area, 43 families were questioned (22 males and 21 females).

District Five (Ryesgade) is situated alongside District Two, less than 100 m away. It is one of the most popu-

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lous streets in Copenhagen, and had a population of 70,000 people before partial demolition began in the area. The buildings are five- and six-story apartment houses with up to three back buildings. An ordinary complex will consist of a front building and two back buildings. The flats are small and insufficiently furnished with hygienic facilities. Heating is mainly separate for each room and is dependent on oil stoves or the like. Daylight in the flats is scanty, and recreation facilities for children and grown-ups are nonexistent in the district. In this area, 214 families have been questioned (101 males and 113 females).

District Six is situated in the inner city (Noerrebro) and has the nickname "the black square." The buildings in the area must be described as slums and are partly condemned. Quality of flats is comparable with that in District Five, but the area is generally considered the worst of the districts studied. Typical flats in districts Five and Six have two rooms and awkward entrance facilities. Narcotics are said to be a problem in this district. In this area, 135 families were questioned (63 males and 72 females).

The respondent was asked to fill out a questionnaire of 109 questions with alternate and/or grouped answers. Instruction was given by the interviewers (medical students), who returned 1½ hours later to collect the forms after having given supplementary instructions, as necessary. Up to five repeated attempts were made to contact persons who were not available or did not answer. The interviewers received their instructions partly as a group at an evening course and partly individually before visiting the districts.

Univariate tables were made for all variables. From a Pearson correlation matrix a screening selected all significant correlations. Corresponding bivariate tables were made in order to study the correlations more closely.

Morbidity, the dependent variable, was defined as the number of episodes of illness, regardless of the duration. All other answers were considered independent variables. We used an Automatic Interaction Detector (AID) program to split the material into groups of respondents characterized by discrete values of one or more (uncorrelated) predictors. The principle for the split is a successive search for the predictor that gives the maximum difference between sums of squares for the dependent variable in the two groups. In this paper, the AID results are illustrated as figures forming "three-structures" of "original" and "split" groups.

Results

Frequency Tables

From 930 initial questionnaires the number of cases obtained was 881, covering 2,096 individuals—a response rate of 94.7%. The sample amounted to 12% of the total population in the areas examined; i.e., in District One, 10.5%; in District Two, 19.0%; in District Three, 10.5%; in District Four, 5.5%; in District Five, 12.0%; and in District Six, 17.0% of the population based on the statistical yearbook for Copenhagen 1973.⁷

A two-way display of age and sex in the population investigated is shown in Figure 1. Other characteristics of the different areas are given in Tables 1 and 2. From Table 1 it can be seen that the smallest dwellings (< 25 m²) are most frequent (64.8%) in District Four and the largest ones (> 200 m²) are to be found in District One and Two.

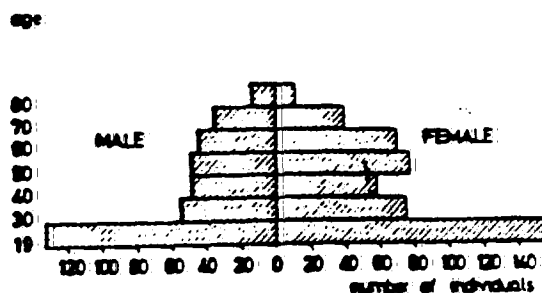


Fig. 1. Respondents' distribution by age and sex.

A low standard of housing is found in Districts Four, Five, and Six, characterized by, among other things, drafts and cold and a lack of hot water or bath tub, especially in District Four, where bathing facilities do not exist. Also in District Four, water closets outside the dwellings are found in up to 90.5% of the cases. However, in this district most people are content with their area of residence and present excellent personal hygiene as compared with the other districts (Table 1).

The highest average figure for overcrowding, measured as individuals per room (kitchen included), was 0.68 in District Five (Table 2). The best housing standards are found in Districts One and Two, while Four, Five, and Six are inferior in this respect.

A summarized description of morbidity in the different areas is found in Table 3. On the whole, morbidity was low in District Two and high in District Five for all age groups, the 3- to 6-year-old children being an exception, with higher morbidity in District Three.

The highest morbidities were reported from District Five, which has the lowest housing standard next to that of District Four. In this latter district the morbidity of the adults was high, but the effect of environment and other factors on child morbidity could not be evaluated on account of the unusually small number of children living in this district.

The lowest morbidity was found in District Two. This district was rather homogeneous and did not show the large variation in housing standards found in other districts.

In District Five and especially in District Six the "thriving" was lowest. Almost every second person expressed an absolute intention of changing to another dwelling and district. However, in the other districts that represented old houses of low standards, nobody expressed any great wish or intention to move. Those who wished to move from District Four, for instance, represented only 7% and 4.8% of the population, with complaints about dwelling and area of residence, respectively. The people in this district have given public expression to their desire to preserve the area in its present condition, contrary to the authorities' intention to clear the area because of the low hygienic standard of the buildings.

Correlation Matrix

From the correlation matrix some associations between morbidity and other examined variables may be suggested. For 1- to 6-year-old children in these areas of Copen-

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Table 1.--Some Characteristics of the Six Residential Districts in Copenhagen

CHARACTERISTICS	"ONE" N %	"TWO" N %	"THREE" N %	"FOUR" N %	"FIVE" N %	"SIX" N %
Dwelling < 25 sq.m.	0 0.0	4 4.5	17 9.2	27 64.3	18 8.5	19 14.4
Dwelling > 100 sq.m.	76 43.7	44 49.4	28 15.2	1 2.4	24 11.4	15 11.4
Dwelling > 200 sq.m.	23 13.2	5 5.6	2 1.1	0 0.0	0 0.0	0 0.0
Dwelling > 6 rooms	28 15.2	14 15.2	17 8.5	0 0.0	8 3.6	9 6.6
Draft and cold	8 4.3	7 7.7	14 7.0	4 9.1	46 21.1	32 23.5
Hot water lacking	8 4.3	6 6.7	31 16.2	29 78.4	114 54.8	61 46.9
Shower lacking	22 11.9	17 19.5	90 47.1	36 100.0	175 83.3	108 35.7
Bath tub lacking	38 20.5	22 26.5	129 69.4	36 100.0	196 95.1	118 95.9
Single room heating	25 14.0	6 6.7	46 24.7	26 65.0	106 53.0	50 39.4
Closet outside dwell.	4 2.2	6 6.7	17 8.6	38 90.5	35 16.1	24 18.0
Danger of accidents in dwelling	14 7.7	7 7.7	31 15.7	9 21.4	63 29.0	43 32.1
Contentment with dwelling	65 35.1	48 52.2	83 41.3	14 31.8	27 12.3	17 12.5
Contentment with "district"	77 41.6	43 46.7	105 52.2	36 83.7	27 12.3	14 10.3
Occup.: Workers	17 9.5	2 2.2	18 9.2	8 19.0	69 32.2	46 34.3
Absolutely intent on changing dwelling	34 18.5	12 13.2	36 18.2	3 7.1	106 47.9	74 55.2
Income > 100,000 d.kr. per year	40 23.1	16 18.2	16 8.4	0 0.0	6 3.0	2 1.5
Education level high	44 24.4	24 26.7	73 36.5	15 35.7	19 9.7	22 16.3
Education level low	57 31.7	32 35.6	75 37.6	18 42.9	153 72.1	96 71.1
Never using shower	32 18.2	13 15.7	39 19.8	3 7.0	48 22.9	17 13.3
Never using bath tub	45 24.7	28 33.7	108 55.4	23 56.1	139 68.5	86 68.8
> 10 cigarettes per day	33 27.3	19 38.8	32 28.3	16 48.5	55 37.7	39 40.2

N = Number of respondents
 % = Percentage of respondents within the district

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hagen, reported morbidity in the period March 1972-March 1973 was correlated with the parents' dissatisfaction with their partner's occupation ($P < .01$), the number of small children in the family ($P < .01$), the parents' dissatisfaction with the environment and spare-time facilities within

the area of residence ($P < .05$) and with their housing standard ($P < .05$), as well as with parents' morbidity ($P < .05$), and common colds in particular ($P < .01$). For the 7-18 year age group, morbidity was correlated with the morbidity of the parents ($P < .01$), especially in regard to the parents'

Table 2.-Population Characteristics of the Six Residential Districts in Copenhagen

Characteristics	ONE		TWO		THREE		FOUR		FIVE		SIX	
	N	%	N	%	N	%	N	%	N	%	N	%
Men responding	89	48.6	33	36.3	71	35.7	22	51.2	101	47.2	63	46.7
Women responding	94	51.4	58	63.7	128	64.3	21	48.8	113	52.8	72	53.3
Children 7-18	58		47		42		0		76		41	
Children 3-6	27		12		26		1		26		25	
Children 1 & 2	25		16		18		3		31		23	
Other family members	172		115		149		15		177		111	
Individuals	460		281		434		62		524		335	
Individuals per room kitchen incl.		0.48		0.52		0.52		0.58		0.68		0.66

N= Number of respondents

%= Percentage of respondents within the district

Table 3.-Self-Reported Morbidity of More Than One Day During the Last 12 Months in Different Age Groups within the Districts

Characteristics	ONE		TWO		THREE		FOUR		FIVE		SIX	
	N	%	N	%	N	%	N	%	N	%	N	%
Adult	94	53.4	43	47.3	109	56.5	26	65.0	151	69.9	84	63.6
Children 7-18	58	63.0	47	43.3	42	62.5	0	0	76	76.4	41	64.3
Children 3-6	22	60.0	12	44.4	26	76.0	2	50.0	26	64.5	25	56.5
Children 1 & 2	25	68.0	16	65.0	18	77.3	3	60.0	31	78.4	23	75.9

N= Number of respondents

%= Percentage of respondents within the age group in the district

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respiratory diseases ($P < .05$).

Morbidity of adults was correlated with dissatisfaction with their partner's occupation ($P < .01$), the quality of housing ($P < .01$), and with dissatisfaction with the environment in the district, i.e., the standard of the district in relation to the other districts ($P < .05$). Respiratory symptoms in particular seemed to be responsible for their morbidity, expressed as coughing, phlegm production, and wheezing in the chest. Illnesses of the adults during the last month of study (March 1973) were also related to these respiratory symptoms ($P < .05$) and coincided with an increased morbidity among the children ($P < .05$).

In addition to the cited results, a great number of correlations that did not concern morbidity were found. None of these was surprising.

AID Analysis of Single Predictors

Analysis of morbidity of adults within the last 12 months showed a split into seven groups (Fig. 2). Fatiguing work at home formed the basis for the primary split. The group with outspoken complaint of fatiguing work and with higher morbidity showed a secondary split into a still higher morbidity level in the socially worse districts, namely, Districts Five and Six, and a lower morbidity for those living in Districts One, Two, Three, and Four. For the other group with little or no fatiguing work at home, the secondary split was based on the predictor "contentment with the dwelling." Those not content with their dwelling were further split by the predictor "drafts and cold," and those satisfied with their dwelling were split once more by "fatiguing work at home." Contentment with one's occupation caused a further split within this last group.

The corresponding morbidity of adults within the last month (March 1973) showed a primary split based on the

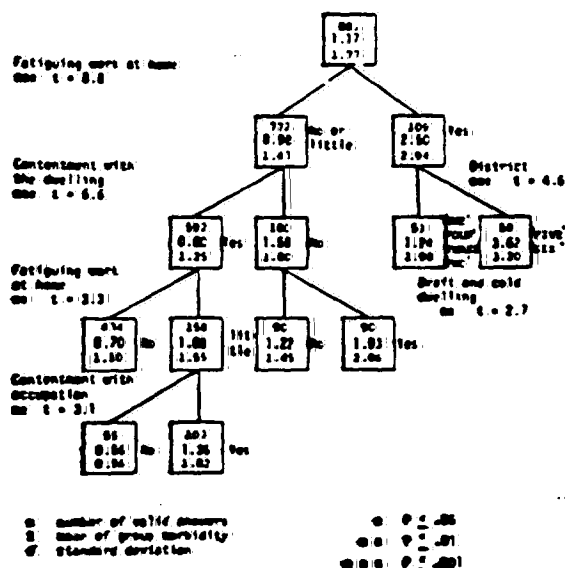


Fig. 2. Morbidity of adults during 12 months: AID analysis of single predictors.

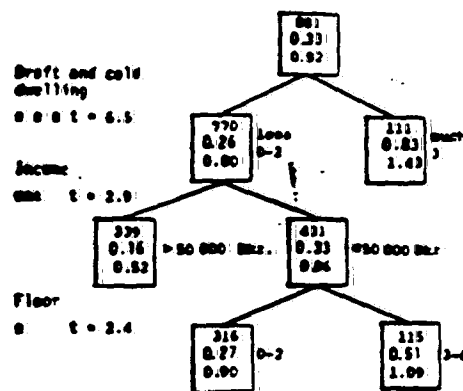


Fig. 3. Morbidity of adults during last month: AID analysis of single predictors. For key to Figures and symbols, see Figure 2.

housing standard, expressed as drafts and cold in the dwelling, while the yearly income of the family became a secondary predictor for those complaining less about drafts and cold in the dwellings (Fig. 3). For those with a higher income, the level of the apartment above the street was a third predictor for their morbidity.

In a separate analysis of the 228 single individuals included in the study, it was found that the morbidity during the last year was predicted by fatiguing work at home. For those not stressed by this factor, morbidity was predicted by districts (Fig. 4). The morbidity of the 653 married persons was primarily predicted by their contentment with their dwellings. Complainers who had a higher morbidity were further split by the presence or absence of dampness in the dwelling, and of these, those without

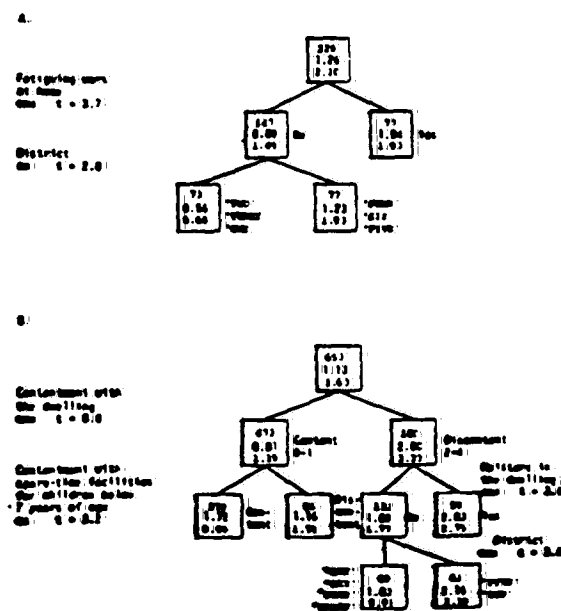


Fig. 4. Morbidity of single persons (A) and married persons (B). AID analysis of single predictors. For key to Figures and symbols, see Figure 2.

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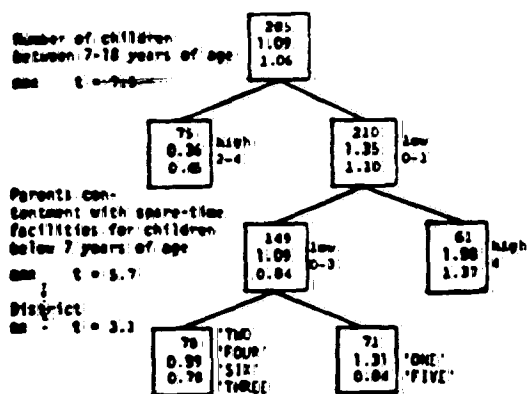


Fig. 5. Morbidity of children of 7-18 years of age: AID analysis of single predictors. For key to Figures and symbols, see Figure 2.

dampness had a lower morbidity and showed a tertiary split by district. Morbidity for the group with high contentment with their dwelling in the primary split was in the next step predicted by their contentment with spare-time facilities for children under 7 years of age. Those content with the facilities had a lower morbidity (Fig. 4).

The mean morbidity of all children studied was increased in families with few children in the age group 7-18 years of age. The secondary predictor was their parents' contentment with the spare-time facilities for the children under 7 years of age. Children of parents who were least content with these facilities had the highest morbidity.

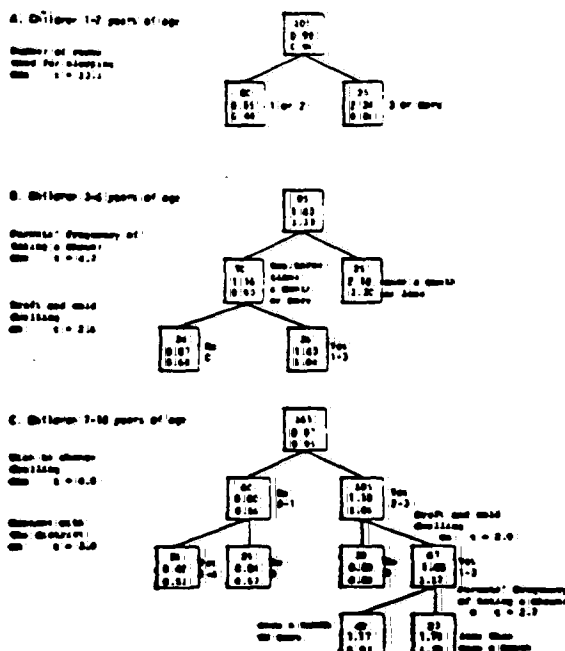


Fig. 6. Morbidity of children 1-2 years of age (A), 3-6 years of age (B), and 7-18 years of age (C). AID analysis of single predictors. For key to Figures and symbols, see Figure 2.

A third predictor for morbidity was the area of residence (Fig. 5).

The morbidity of the youngest children investigated, 1 and 2 years of age, was predicted by the number of rooms used for sleeping purposes at home (Fig. 6). The best predictor for the morbidity of children 3-6 years of age was the personal hygiene of their parents, measured as the frequency of taking showers (Fig. 6). Thus, parents taking a shower with a frequency of less than once a month were associated with an increased morbidity of this age group of children. For families with better hygiene in this respect, the housing standard, expressed as drafts and cold in the dwelling, became another predictor for the morbidity of these children.

The morbidity of children 7-18 years of age (Fig. 6) was in the first place predicted by the parents' strong wish to change their dwelling, and in the second place by the discomfort from drafts and cold. The third predictor was the parents' personal hygiene, i.e., their frequency of taking a shower. The group with low morbidity in the first step was further split by the parents' contentment with the area of residence.

AID Analysis of Grouped Predictors

After the split of the material into homogeneous morbidity groups on the basis of single predictors, we combined predictors into group factors: "thriving," "housing standard," "personal hygiene," "tobacco consumption," and "alcohol consumption." The specific procedures may be obtained from the authors.

"Thriving" refers to the level of contentment as studied by the following parameters: respondent and partner's contentment with dwelling, district, neighbors, and occupation; their desire to move or to change place of

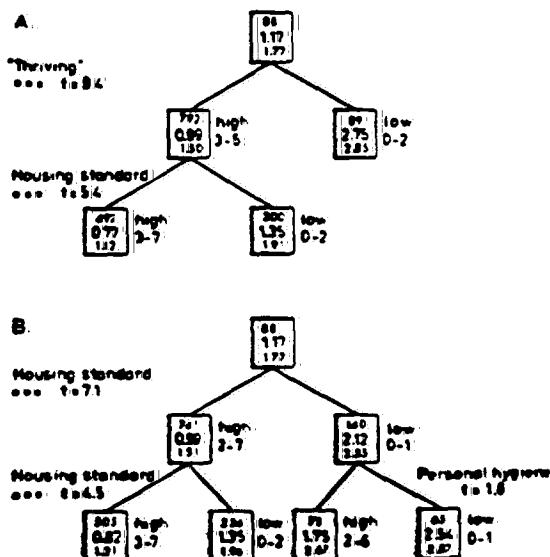


Fig. 7. Morbidity of adults. "Thriving" factor included (A) and excluded (B) in the AID analysis of grouped predictors. For key to Figures and symbols, see Figure 2.

occupation; and the respondent's contentment with spare-time facilities for children 3-6 and 7-18 years old. The "thriving" factor eliminated the other group factors, with the exception of "housing standard," as a predictor for splitting into groups by morbidity during the last year (Fig. 7). As thriving may be questionable as an independent variable, analysis was also undertaken with this factor excluded. Such an analysis yielded "housing standard" as the best predictor for adult morbidity, followed by "personal hygiene" (Fig. 7).

In analyses in which the adults' cases of illness, inclusive of chronic symptoms, were analyzed in an analogous way, "thriving" turned out to be the best predictor, followed by "housing standard" for the high "thriving" and "personal hygiene" for the low "thriving." With better hygiene, "thriving" again became the dominant predictor for those in the low "thriving" group, while "housing standard" was more important for those in the group with high "thriving." In a corresponding analysis where "thriving" was excluded, only "housing standard" remained as a predictor for morbidity.

The morbidity of adults during the last month (March 1973) was best predicted by their "thriving," followed by "housing standard" for those with high "thriving." Exclusion of "thriving" from the analysis yielded "housing standard" as the only predictor for morbidity.

An investigation of the unmarried persons by the AID analysis of grouped factors showed that "personal hygiene" was the only predictor for their morbidity during the last year (March 1972-March 1973); this was true whether the "thriving" factor was included or not. On the other hand, as far as the married respondents were concerned, the AID analysis showed that the "thriving" factor was the dominating predictor for their morbidity during the year of the investigation. For persons with low "thriving" and high morbidity no other predictors turned up. The morbidity of persons with high "thriving" and better health was further predicted by "housing standard," again followed by "thriving." In a corresponding analysis, where the "thriving" factor was excluded, "housing standard" turned out to be the prominent predictor for morbidity of married respondents.

When the respondent units, i.e., the respondents including any other family members, are considered as a target group, and the morbidity of the mean individual in these units is sought, the corresponding AID analysis shows that the predictor "thriving" again occurred as the dominant factor, followed by "housing standard." In a further analysis, when the predictor "thriving" was excluded, "housing standard" once more turned out as the only predictor for morbidity.

Multiple Regression Analysis

An attempt to use step-wise multiple regression technique (twenty-nine of the fifty-seven most significant variables) to obtain more quantitative evaluations gave as "best" result for the morbidity an explanation of 35% of the total variance, and this was only true for the 7- to 18-year-old children. The corresponding analysis with the variables grouped into factors of "housing standard," "personal hygiene," "alcohol consumption," "tobacco con-

sumption," and "thriving" did not yield more conclusive results.

Discussion

A comparison between our results and earlier studies in which housing standard and related factors have been investigated, e.g., Vagn Christensen's study in 1956,⁶ is difficult, primarily because of the lack of objective measures of the "hygienic standard" used in these studies. Christensen used mortality among children of 0-2 years of age as an indication of low housing standard. Furthermore, our results from 1973 are not comparable with these studies because of the changes which have occurred since then in, for example, the social structure and the standard of living.

On the other hand, many epidemiological studies have not given attention to whether the study's relationships were linear or followed an irregular, logarithmic, or other function. For linear relationships correlation analysis might be sufficient, but for, e.g., irregular relationships such as those for quality of life, the nonlinear dependent AID analysis gives more valuable information. This was one of the reasons we used this form of analysis in our study.

In this study, which is concerned with morbidity in general, the factor "thriving" (satisfaction) was the most prominent predictor for health as compared with other group factors, such as "housing standard," "personal hygiene," "tobacco consumption," and "alcohol consumption." Like morbidity, however, thriving can to a great extent be considered as a function of the society. Thus thriving and morbidity have many connections in common and do not necessarily express a direct connection of causes, even though it is well known that thriving influences our well-being and thereby our health. An interesting aspect of this investigation, however, was that the connection between thriving and morbidity was stronger than the correlation between morbidity and other hygienic and social factors. Furthermore, the most outstanding correlation coefficient found in this study concerned the morbidity of children under 7 years of age and the parents' dissatisfaction with the spare-time facilities for this age group, and, further, the parents' dissatisfaction with their partner's occupation (two of the thirteen components in the group factor "thriving").

That thriving turned out to be the most prominent factor for morbidity in general was surprising, but not many studies have been performed in which the relative importance of this factor is analyzed in comparison with others. However, in 1974 Kato et al.,⁸ using four different questionnaires distributed in four cities in Japan, also showed that "subjective feeling of satisfaction" was most significantly correlated with health, and, as they say, "might work to cover shortage of other resources."

The importance of thriving is also reflected in other investigations where, in spite of different definitions, it has been proven to play a prominent role. In Denmark, for instance, E. Pedersen has emphasized in his different works⁹ the importance of thriving in the working environment, and has shown that a person's expectations and the fulfillment of these determine the thriving of the person. The studies made by O. Berg in southern Greenland show that there is a connection between morbidity, satisfaction, and hous-

ing conditions, which connection O. Berg related to the special living conditions in this part of arctic Denmark.^{10, 11}

In the present study the importance of psychological factors for health is strengthened by the fact that morbidity for adults was predicted by their dissatisfaction with the area of residence, the dwelling, and the partner's occupation. These factors, as well as some habits of the parents (e.g., the frequency of taking a shower) and the physical and psychological contact within the family group (number of sleeping rooms, older siblings, etc.), also influenced the morbidity of the children. In the light of these findings, morbidity appears to be more dependent on psychological factors than on technical and social standards.

The predictor "fatiguing work in the dwelling," which in this study has appeared as a predictor for morbidity, is difficult to estimate; it may reflect many factors and may be in itself partly a causal factor. However, whenever poor housing standard was demonstrated as an important predictor for morbidity, the factor "fatiguing work in the dwelling" may be a causal factor in this relation. This applies especially to Districts Five and Six, where housing standards are poorest, and which more often than not are inhabited by older people.

Overcrowding, i.e., more than 1.5 individuals per room, including the kitchen, could not be demonstrated to have an effect since 0.7 was the highest number found for this factor. The effects of overcrowding by other definitions, such as only one child in families living in one- or two-room apartments,⁶ have not been evaluated. The study did not indicate increased morbidity for children with increasing size of the family. Furthermore, in contrast to Christensen,⁶ no correlation was found between morbidity and the area of the dwelling. On the contrary, the morbidity of the youngest children increased with the number of rooms used for sleeping.

Almost all other of the 109 different parameters investigated, like civil status, sex, education, and occupation, showed no important statistical associations, with one exception: the total yearly income of the family. This only had influence as a secondary predictor for morbidity, during the last month of the investigation, of adults who had a better housing standard.

The negligible effects of tobacco and alcohol must be evaluated in the light of the fact that morbidity in this study covers morbidity in general. Furthermore, the influence of parents' tobacco smoking on the morbidity of the youngest children of 1-4 years of age, found by D.J. Hammer et al.,¹² could not be confirmed in our study. The relative influence of tobacco and alcohol on specific symptoms and diseases might give other results but was not evaluated in this study.

By and large this study indicated the importance of thriving for the health of people. It should be pointed out that people in some old-fashioned districts fight for the right to stay and to preserve the present environment of the houses, while at the same time up to 50% of people in new flats in the suburbs express a wish to move.¹³ This fact seems to indicate that modern planning in Copenhagen

has failed to provide an environment acceptable to people of our time, which was the original intention.

Conclusion

The results obtained indicate that measures to improve the public health should also aim at increasing the thriving of people in their environment, at home, in their area of residence, and at work, or at least at protecting them from processes that might in any respect disturb their thriving. Community health planning and education should to a greater extent attend to housing standards, spare-time facilities, and efforts to improve personal hygiene.

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